WHAT IS CLAIMED IS:

1. An optical interconnection device comprising an optical waveguide layer, wherein the waveguide layer is equipped with a plurality of electrodes which are independently drive-controllable such that a refractive index distribution is generated in the waveguide layer by drive control of the electrodes to control a propagation state of light in the waveguide layer, and an optical interconnection port is provided on an upper or lower surface or inside of the waveguide layer.

2. The optical interconnection device according to claim 1, wherein the optical interconnection port is comprised of an optical element for receiving or emitting a light in a direction approximately perpendicular to a light-waveguiding surface and an optical path conversion means provided corresponding to the optical element at a given position in the waveguide layer.

3. The optical interconnection device according to claim 2, wherein the optical path conversion means is a light reflector with a convex shape, and the optical element is a plurality of surface elements arranged around a top of the convex of the light reflector with their centers deviated from the top of

the convex such that each optical element effects emission or reception only to and from a limited region within the waveguide layer.

4. The optical interconnection device according to claim 2, wherein the optical element is a surface element comprised of a semiconductor crystal and has such a constitution that only a thin film layer necessary for receiving or emitting light of the semiconductor crystal is transferred to the waveguide layer and a semiconductor substrate is omitted.

5. The optical interconnection device according to claim 1, wherein the drive-controllable electrodes are divided in plurality and provided on one side or both sides of the waveguide layer.

6. The optical interconnection device according to claim 5, wherein the drive-controllable electrodes are a plurality of heaters provided on a surface of the waveguide layer and a refractive index distribution is generated in the waveguide layer by temperature control with the electrodes.

7. The optical interconnection device according to claim 5, wherein the drive-controllable electrodes are provided in plurality on a surface of the

waveguide layer so as to enable local electric-field application and a refractive index distribution is generated in the waveguide layer by electric-field control with the electrodes.

8. A photoelectric mixedly mounted device comprising integrally the optical interconnection device set forth in claim 1, an electronic device connected to an optical interconnection port provided in the optical interconnection device and an electric wiring layer.

9. The photoelectric mixedly mounted device according to claim 8, having a package form equipped with a connection terminal for electric connection with the outside.

10. The photoelectric mixedly mounted device according to claim 8, having a connection port for optical interconnection to the outside.

11. The photoelectric mixedly mounted device according to claim 8, having such a configuration that a pattern of a manner of optical interconnection of the photoelectric mixedly mounted device is stored in a memory inside or outside of device, and the pattern is read from the memory in accordance with an

instruction to change the optical interconnection to switch an operation of the device.

12. The photoelectric mixedly mounted device according to claim 8, having such a configuration that a pattern of a manner of optical interconnection of the photoelectric mixedly mounted device is downloaded as a design asset from outside of the device and rewritten, and an operation of the device is switched on the downloading.

13. An electronic equipment comprising the photoelectric mixedly mounted device set forth in any one of claims 8 to 12 to have such a configuration that connections between IC chips is freely reconfigured and a plurality of built-in systems are switched by one equipment.